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10/530,396	02/02/2006	Jose Munoz Leo	101689.56077US	5778

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EXAMINER	
KIM, HEE-YONG	
ART UNIT	PAPER NUMBER
4192	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/530,396	LEO, JOSE MUNOZ	
	Examiner	Art Unit	
	HEE-YONG KIM	4192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 April 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/7/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because the rectangular boxes 1-7 in Fig. 1 need to label . Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: the subtitle of The Drawings Description should be moved before The Detailed Description in the order as described in the following guide line.

Appropriate correction is required.

3. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
    (1) Field of the Invention.
    (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(I) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 5-7, 13, 15-17 and 20-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Bowker (US patent 5,467,122), hereafter referenced as Bowker.

6. Regarding claim 1, Bowker discloses "All Under Water Imaging In Real Time, Using Substantially Direct Depth-To-Display-Height LIDAR Streak Mapping". Specifically Bowker discloses *a system for imaging the sea bottom comprising at least; a source of pulsed light* (Pulsed Laser 22 in Fig. 2) *in an expanded* (Pulsed flood beam, column 1, line 36-37) *or concentrated beam* (Narrow beam from pulsed laser, column 1, line 17-18)*; an aiming and focusing system* (Reflector 78, mirror 80 in Fig. 5, column 8, line 21-34) *of said pulsed light beam; a detector* (Photocathode 32 in Fig. 2) *of light reflected form said light pulses; an optical system* (Lens 36, 125 in Fig. 2) *coupled to the detector which may selectively act as a light intensifier/shutter* (Gated Image Intensifiers at column 1, line 36-47) *; an electronic system for exploring and synchronism* (Timing Unit 20 in Fig. 2, column 5, line 61 to column 6, line 7)*; an electronic processing system* (Processor 54 in Fig. 2) *which generates an image that can be displayed on a monitor* (CRT 56 in Fig. 2).

7. Regarding claim 2, Bowker discloses everything claimed as applied above (see claim 1). Bowker further discloses *a system according to claim 1 which in case of using a concentrated beam the detector receives information from a scene in sequential form* (two-dimensional signal, consisting of temporal variation of detected light, at column 4, line 59-63), *as a result of a synchronized two-dimensional scanning* (timing unit 20 in Fig.2, also at column 5, line 61-column 6, line 7) *or sampling of said scene by the pulsed beam and where the detector receives an integrated illumination from a reduced portion of the total scene* (Figure 1 and "illuminate a thin section" at column 5, line 46).

8. Regarding claims 3 and 6, Bowker discloses everything claimed as applied above (see claim 1). Bowker further discloses *a system according to claim 1 which in case of using an expanded beam* (Pulse flood beam) *the detector consists of a two-dimensional array of single detectors* (CCD's), *on which an image is focused prior to detection*, at the column 1, line 36-47.

9. Regarding claim 5, Bowker discloses everything claimed as applied above (see claim 1). Bowker further discloses *A system according to claim 1 which in case of expanded beam illumination the image intensifier/shutter device is an image intensifier tube (Photocathode and MCP and Phosphor layer at column 9, line 54- 67) or it is integrated in the detector.*

10. Regarding claim 7, Bowker discloses everything claimed as applied above (see claim 5). Bowker further discloses *wherein the image provided by the intensifier tube is couple to the detector by means of an optical system* (Lens 50 in Fig.2, at the column 10, line 1-7).

11. Regarding claim 13, Bowker discloses everything claimed as applied above (see claim 1). Bowker further discloses *wherein the pulsed illumination source is a laser source(22)* (Pulsed Laser in Figure 2).

12. Regarding claim 15, Bowker discloses everything claimed as applied above (see claim 13). Bowker further discloses *wherein the laser source is based on a semiconductor diode-laser pumped* (Diode Pumped) *primary oscillation in rare earth ions* (ND-YAG) *and which is subsequently converted* (Frequency doubled) *by means of a nonlinear optical material* (Nonlinear crystal) *to another frequency more suitable for operation of the system* at column 8, line 6-34, and Fig. 5.

13. Regarding claim 16, Bowker discloses everything claimed as applied above (see claim 13). Bowker further discloses *wherein the illuminating laser source operates in a pulsed mode* (a single pulse beam at column 2, line 44) *which is synchronized* (timimg uint in Fig.2, initiates probing unit and issue delay pulse to initiate receiving unit at column 5, line 61- column 6, line 7) *to the temporal windowing of the image intensifier/shutter device in order to select the working distance and distance interval of the light reflected to the detector* (reflection from the medium itself and from any submerged bodies in the medium at column 3, line 5-6).

14. Regarding claim 17, Bowker discloses everything claimed as applied above (see claim 2). Bowker further discloses *wherein the detector used is a photomultiplier tube* (detector such as photomultiplier) at column 6, line 2-3.

15. Regarding claim 20, Bowker discloses everything claimed as applied above (see claim 2). Bowker further discloses *wherein the scanning is made with an electro-optic* (Cathode, Lens, Anode, Photocathode, Electric Plates, and Phosphor in Fig.6).

16. Regarding claim 21, Bowker discloses everything claimed as applied above (see claim 2). Bowker further discloses synchronization of transmitter and receiver, focusing by lens, and field limiting slit aligned with image of fan-beam and also serving to reject scattered light and converting temporal signal into 2-dimensional in Fig.2 and Column 5, line 61- column 6, line 49.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. Claim 4 is rejected under 103(a) as being unpatentable over Bowker in view of Zernov (US patent 6,262,761) hereafter referenced as Zernov.

Regarding claim 4, Bowker discloses everything claimed as applied above (see claim 1). However Bowker fails to discloses *wherein the detector/detectors used are submerged inside the sea water*. However the examiner maintains that it was well known in the art to provide *wherein the detector/detectors used are submerged inside the sea water* as taught by Zernov.

In the similar field of view, Zernov discloses Submersible Video Viewing System. Specifically Zernov discloses submersible video viewing system in Figs 1-2 and column 2, line 19-20.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Bowker by providing *wherein the detector/detectors used are submerged inside the sea water*, as taught by Zernov, for the purpose of temporal gating of image intensifier.

19. Claim 8 is rejected as being unpatentable over Bowker in view of Harris (University of Berkeley, Document No. 8804-W7A), hereafter referenced as Harris.

Regarding claim 8, Bowker discloses everything claimed as applied above (see claim 5). Bowker further discloses *wherein the image provided by the image intensifier tube is coupled to the camera by electron bombardment of the sensitive elements of the camera* (CCD, at the column 10, line 1-7). However Bowker fails to disclose *integrating the image intensifier and the camera in a single device.* However the examiner maintains that it was well known in the art to provide *integrating the image intensifier and the camera in a single device* as taught by Harris.

In the similar field of view, Harris discloses CCD Fiber Optic Bonding Specification. Specifically Harris discloses integration of Intensifier and CCD camera by bonding together in Fig. 3-1.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Bowker by providing *integrating the image intensifier*

and the camera in a single device, as taught by Harris, for the purpose of compactness of a detection system.

20. Claims 9 and 10 are rejected under 103(a) as being unpatentable over Bowker in view of Woodfolk (US patent 4,872,057), hereafter referenced as Woodfolk.

21. Regarding claim 9, Bowker discloses everything claimed as applied above (see claim 5). However Bowker fails to discloses *wherein the selective image intensifier/shutter device performs a temporal windowing based on the inversion of the photocathode bias in said intensifier/shutter device.* However the examiner maintains that it was well known in the art to provide *wherein the selective image intensifier/shutter device performs a temporal windowing based on the inversion of the photocathode bias in said intensifier/shutter device* as taught by Woodfolk.

In the similar field of view Woodfolk discloses Pulse Modulated Automatic Light Control Utilizing Gated Image Intensifier. Specifically Woodfolk discloses gating image intensifier on with negative voltage and off with positive voltage in the column 2, line 51-66.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Bowker by providing *wherein the selective image intensifier/shutter device performs a temporal windowing based on the inversion of the photocathode bias in said intensifier/shutter device*, as taught by Woodfolk, for the purpose of temporal gating of image intensifier.

22. Regarding claim 10, Bowker discloses everything claimed as applied above (see claim 1). However Bowker fails to disclose *wherein the selective intensifier/shutter*

device performs a temporal windowing which allows operation in a wide range of illuminations, including daylight, by means of controlling the operation duty cycle of the photocathode bias voltage or of the detector shutter device. However the examiner maintains that it was well known in the art to provide *wherein the selective intensifier/shutter device performs a temporal windowing which allows operation in a wide range of illuminations, including daylight, by means of controlling the operation duty cycle of the photocathode bias voltage or of the detector shutter device*, as taught by Woodfolk.

In the similar field of view Woodfolk further discloses *gating duty cycle* duration in accordance with the scene illumination so as to control the light level of the camera in the summary of the invention, and also discloses that his invention can deal with broad range of illumination including daylight at column 7, line 1-9.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Bowker by providing *wherein the selective intensifier/shutter device performs a temporal windowing which allows operation in a wide range of illuminations, including daylight, by means of controlling the operation duty cycle of the photocathode bias voltage or of the detector shutter device*, as taught by Woodfolk, for the purpose of extending detection in the various illumination conditions.

23. Claim 11 is rejected under 103(a) as being unpatentable over Bowker in view of Jerram (Proceedings of SPIE Vol. 4306, pp.178-186), hereafter referenced as Jerram.

Regarding claim 11, Bowker discloses everything claimed as applied above (see claim 6). However Bowker fails to disclose *wherein the intensifier-camera set is replaced by a CCD or CMOS camera that may operate under extremely low illumination levels*. However the examiner maintains that it was well known in the art to provide *wherein the intensifier-camera set is replaced by a CCD or CMOS camera that may operate under extremely low illumination levels,* as taught by Jerram.

In the similar field of view Jerram discloses "The LLLCCD: Low Light Imaging Without the need for an intensifier". Specifically Jerram discloses that LLCCD (Low Light Level CCD) is capable of providing useful performance at the very low light levels without intensifier in the summary.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Bowker by providing *wherein the intensifier-camera set is replaced by a CCD or CMOS camera that may operate under extremely low illumination levels*, as taught by Jerram, for the purpose of cost reduction by getting rid of intensifier.

24. Claim 12 is rejected under 103(a) as being unpatentable over Bowker in view of Blouke (US patent 5,444,280), hereafter referenced as Blouke.

Regarding claim 12, Bowker discloses everything claimed as applied above (see claim 6). However Bowker fails to discloses *wherein the CCD or CMOS camera includes detectors or sensors in which the photogenerated electric charge is amplified in the detector itself by means of charge carrier avalanche or ion impact prior to*

generation of the output electric signal stored in its series register. However the examiner maintains that it was well known in the art to provide *wherein the CCD or CMOS camera includes detectors or sensors in which the photogenerated electric charge is amplified in the detector itself by means of charge carrier avalanche or ion impact prior to generation of the output electric signal stored in its series register,* as taught by Blouke.

In the similar field of view Blouke discloses Photodetector Comprising Avalanche Photosensing Layer and Intensifier CCD Readout Layer. Specifically Blouke discloses the layers of *Avalanche* device (2) which is responsible for photo detection and amplification, and *CCD* (4) which is responsible for photo-electron storage and readout in Figure 1, and also described in the column 3, line 61 to Colum 4, line 17.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Bowker by providing *wherein the CCD or CMOS camera includes detectors or sensors in which the photogenerated electric charge is amplified in the detector itself by means of charge carrier avalanche or ion impact prior to generation of the output electric signal stored in its series register*, as taught by Blouke, for the purpose of integration of amplification and storage of photo-electron.

25. Claim 14 is rejected under 103(a) as being unpatentable over Bowker in view of Schmitschek (US patent 4,229,711), hereafter referenced as Schmitschek.

Regarding claim 14, Bowker discloses everything claimed as applied above (see claim 13). However Bowker fails to discloses *wherein the laser source operates in the*

blue-green region of the visible spectrum, corresponding to the spectral region where light attenuation in sea water is minimum. However the examiner maintains that it was well known in the art to provide *wherein the laser source operates in the blue-green region of the visible spectrum, corresponding to the spectral region where light attenuation in sea water is minimum,* as taught by Schmitschek.

In the similar field of view Schmitschek discloses Metal Dihalide Photodissociation Cycle Laser. Specifically Schmitschek discloses that the blue-green wavelength is known to be best transmitted through ocean waters in the column 2, line 40-44.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Bowker by providing *wherein the laser source operates in the blue-green region of the visible spectrum, corresponding to the spectral region where light attenuation in sea water is minimum*, as taught by Schmitschek, for the purpose of having least light attenuation.

26. Claim 18 is rejected under 103(a) as being unpatentable over Bowker in view of Kerr (US patent 4916536).

Regarding claim 18, Bowker discloses everything claimed as applied above (see claim 2). Bowker further discloses that the detector array shown is a CCD, but it could be easily be a diodearray, and in particular, a *photodiode* at column 6, line 46-50. However Bowker fails to disclose that the detector used is particularly *avalanche*

photodiode. However the examiner maintains that it was well known in the art to provide *wherein the detector used is an avalanche photodiode,* as taught by Kerr.

In the similar field of view Kerr discloses Wide Angle Video Rate Imaging Range Finder. Specifically Kerr discloses avalanche photodiode is used as detector in the column 6, line 10-12.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Bowker by providing *wherein the detector used is an avalanche photodiode*, as taught by Kerr, for the purpose of substitution of CCD.

27. Claim 19 is rejected under 103(a) as being unpatentable over Bowker.

Regarding claim 19, the invention is equivalent to claim 6 except that there is no image intensifier whose function is an enhancement of detection by amplifying photo-electron before they are detected by CCD. The examiner maintains that the invention is not patentably distinct from claim 6 by removing image intensifier device from the combination of both intensifier and CCD, because image detection function is still there even without intensifier.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Jules Jaffe et al., "Underwater Optical Imaging: Status and Prospects", Oceanography Vo. 14, No.3, pp 64-75, 2001

b. John Klepsvik et al.,"A Novel Laser Radar System for Subsea Inspection and Mapping", Oceans '94. 'Oceans Engineering for Today's Technology and Tomorrow's Preservation.' Proceedings, Sep. 1994

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeff Harold can be reached on 571-272-7519. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HEE-YONG KIM/ /LUN-YI LAO/

Examiner, Art Unit 4192

Supervisory Patent Examiner, Art Unit 4100